New Utility Patent Application
Applicant: Sanjai Singh *et al.*
Docket No.: MWS-089
Title: *Transforming Graphical Objects in a Graphical Modeling Environment*
Express Mail Label No.: EV311018527US   Sheet 1 of 12

Fig. 1A

New Utility Patent Application
Applicant: Sanjai Singh *et al.*
Docket No.: MWS-089
Title: *Transforming Graphical Objects in a Graphical*
       Modeling Environment
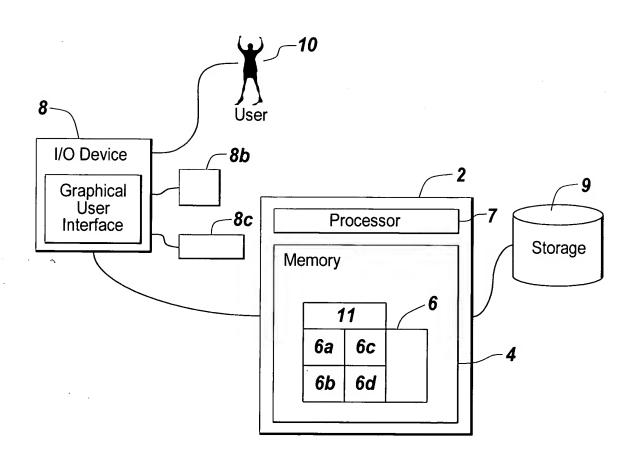Express Mail Label No.: EV311018527US   Sheet 2 of 12

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Create Block Diagram — *12*

Compile Block Diagram — *14*

Link Block Diagram — *16*

18

Execute Using Interpretive Mode

-or-

Generate Code

Execute Block Diagram Using Code

-or-

Generate Code

Use Code Elsewhere

-or-

Linearize

Fig. 1B

New Utility Patent Application
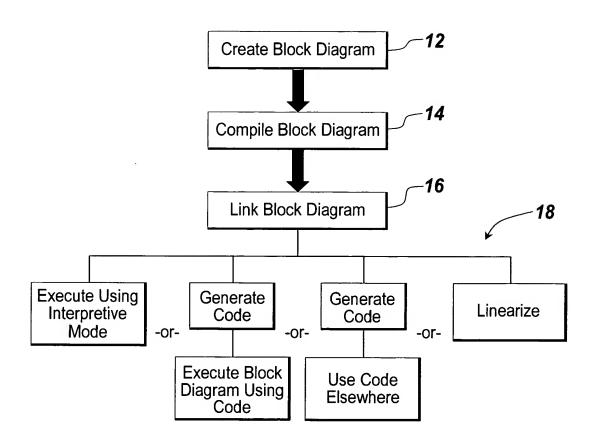Applicant: Sanjai Singh *et al.*
Docket No.: MWS-089
Title: *Transforming Graphical Objects in a Graphical
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200 ⟶

202

branced_ex   ▬ ☐ ✕

File   Edit   View   Simulation   Format   Tools   Help

☐ ☞ ☐ ✏ │ ✂ 🗐 ▣ │ ↺ ↻ │ ▶ ■ │ Normal ▼ │ ⬚ ◈

210   211   231
                                          230   223   234
                          Elevator   ┌──┐
Sine Wave   Out1   │ 1│
test input1   └──┘
                                                                      Out1
220   221   232
                          Vertical Gust wGust (ft/sec)

Sine Wave
test input2
                                         Subsystem

Ready   100%   ode45

204

branced_ex/Subsystem   ▬ ☐ ✕

File   Edit   View   Simulation   Format   Tools   Help

☐ ☞ ☐ ✏ │ ✂ 🗐 ▣ │ ↺ ↻ │ ▶ ■ │ Normal ▼ │ ⬚ ◈

        231   2110   242   212   230
     ┌──┐   ┌───┐
     │ 1│─────●──────────────│Zd │   246   233
     └──┘   └───┘   ┌───┐
   Elevator   244   Gain   │ + │   234   ┌──┐
                                    247   │ + │   │ 1│
        211   └───┘   └──┘
                      ┌───┐   Out1
                      │ + │   2500
                      │ + │   248
                      └───┘   ┌──────┐
        232 221   246   │ (z-1)│◄────   2210
     ┌──┐   │──────│
     │ 2│────────●──────────────│z(z-0.5)│   250
     └──┘   └──────┘
   Vertical Gust   2210   Discrete
   wGust (ft/sec)   Zero-Pole

Ready   100%   ode45

Fig. 2A

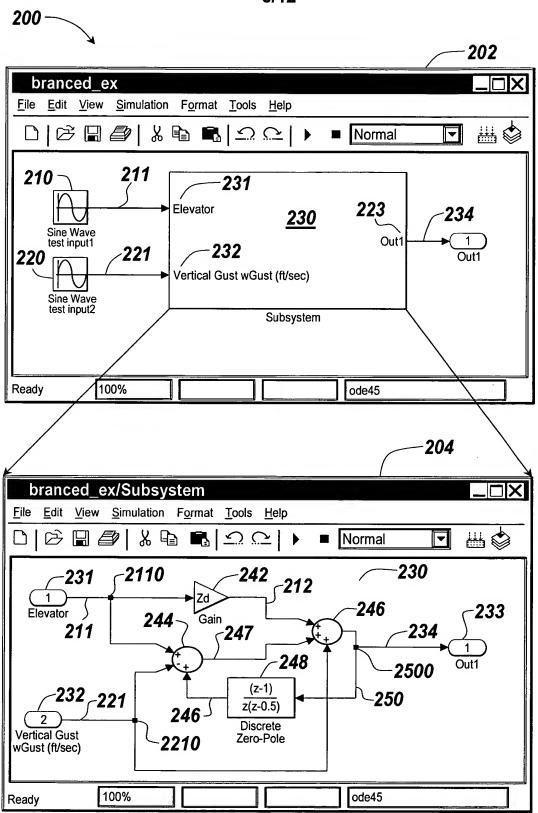New Utility Patent Application
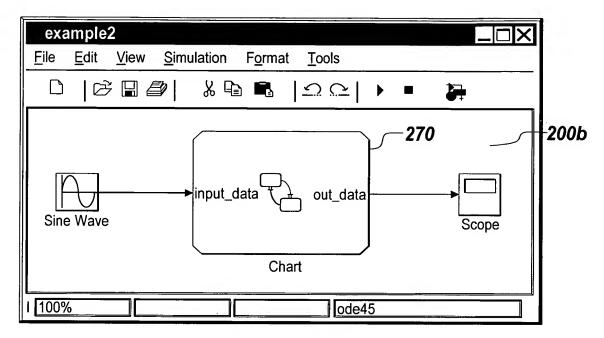Applicant: Sanjai Singh *et al.*
Docket No.: MWS-089
Title: *Transforming Graphical Objects in a Diagramming Environment*
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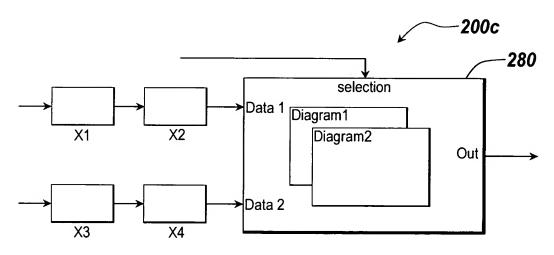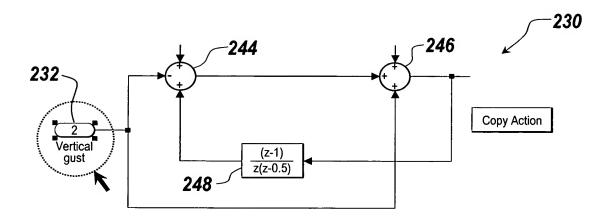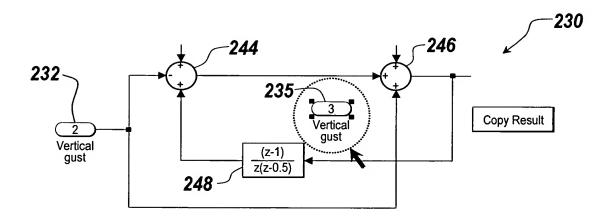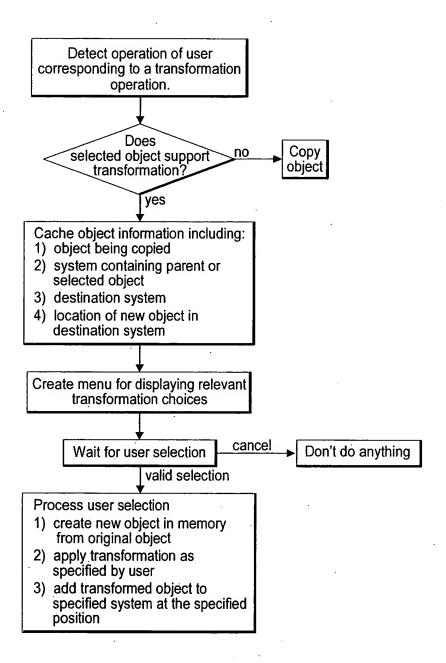
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Fig. 2B

Fig. 2C

New Utility Patent Application
Applicant: Sanjai Singh *et al.*
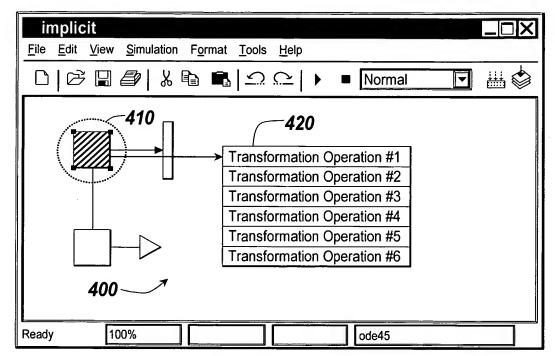Docket No.: MWS-089
Title: *Transforming Graphical Objects in a Graphical
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Fig. 3A

(Prior Art)

Fig. 3B

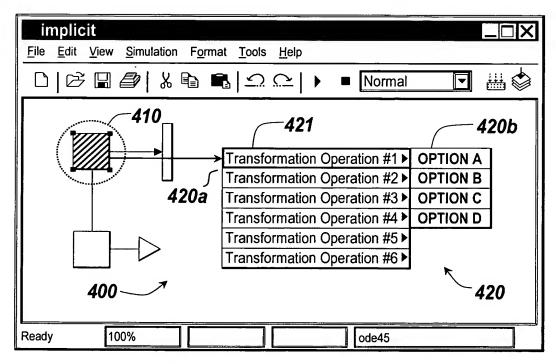*(Prior Art)*

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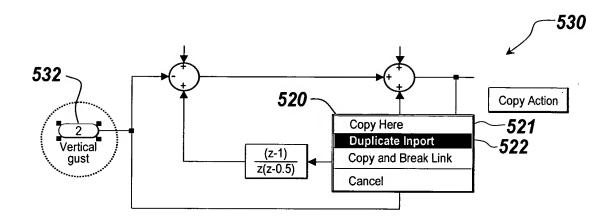Express Mail Label No.: EV311018527US   Sheet 6 of 12

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Detect operation of user corresponding to a transformation operation.

Does selected object support transformation? —no→ Copy object

yes

Cache object information including:
1) object being copied
2) system containing parent or selected object
3) destination system
4) location of new object in destination system

Create menu for displaying relevant transformation choices

Wait for user selection —cancel→ Don't do anything

valid selection

Process user selection
1) create new object in memory from original object
2) apply transformation as specified by user
3) add transformed object to specified system at the specified position

Fig. 4

New Utility Patent Application
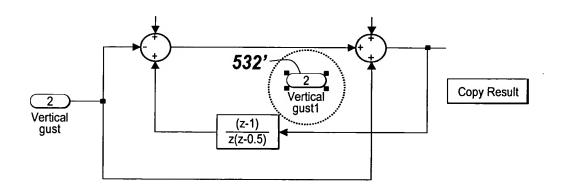Applicant: Sanjai Singh *et al.*
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Fig. 5A

Fig. 5B

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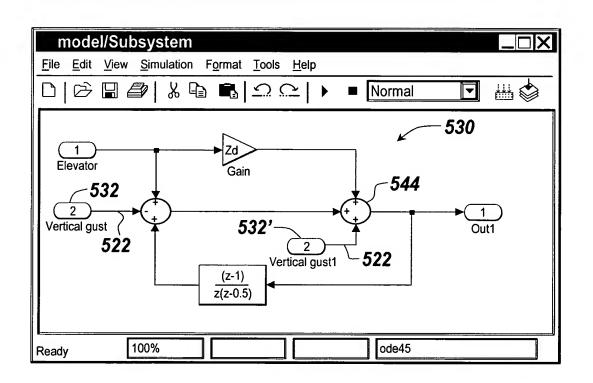Express Mail Label No.: EV311018527US   Sheet 8 of 12

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530

532

2

Vertical
gust

$\frac{(z-1)}{z(z-0.5)}$

520

Copy Here	**521**
Duplicate Inport	**522**
Copy and Break Link	
Cancel	

Copy Action

Fig. 6A

2

Vertical
gust

$\frac{(z-1)}{z(z-0.5)}$

532'

2

Vertical
gust1

Copy Result

Fig. 6B

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Modeling Environment
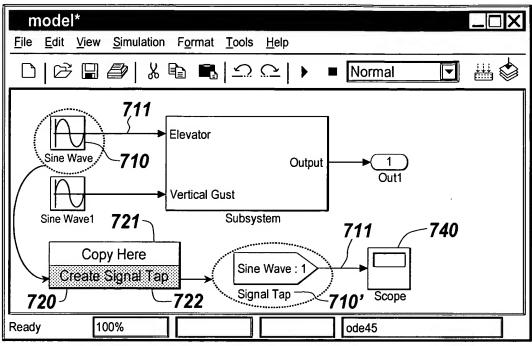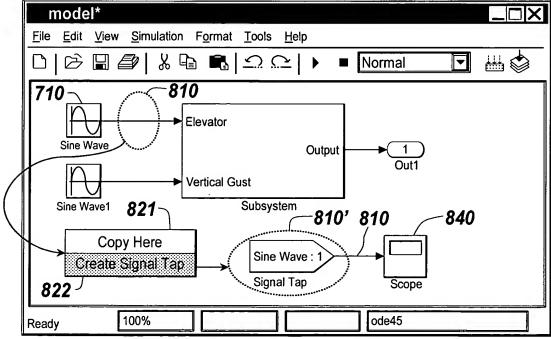Express Mail Label No.: EV311018527US   Sheet 9 of 12

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model/Subsystem

File   Edit   View   Simulation   Format   Tools   Help

Normal

530

1
Elevator

Zd
Gain

532

2
Vertical gust

522

544

532'

2
Vertical gust1

522

1
Out1

(z-1)
―――――
z(z-0.5)

Ready   100%   ode45

Fig. 7

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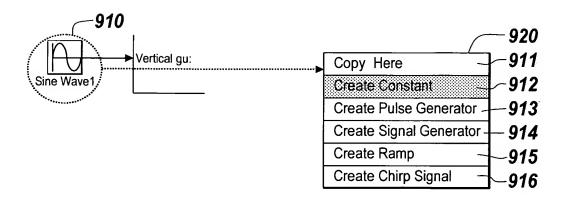Express Mail Label No.: EV311018527US   Sheet 10 of 12

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Fig. 8

Fig. 9

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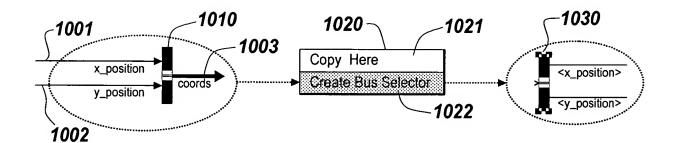
11/12

910

Sine Wave1

Vertical gu:

920

Copy Here	*911*
Create Constant	*912*
Create Pulse Generator	*913*
Create Signal Generator	*914*
Create Ramp	*915*
Create Chirp Signal	*916*

Fig. 10

1001   *1010*   *1003*

1020   *1021*

1030

x_position

y_position

coords

1002

Copy Here

Create Bus Selector

1022

<x_position>

<y_position>

Fig. 11

New Utility Patent Application
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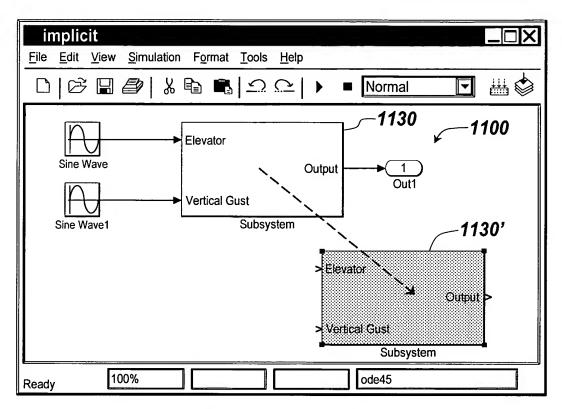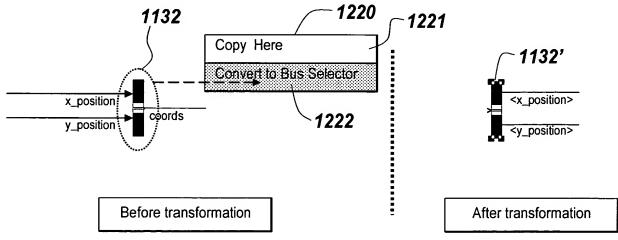**12/12**

Fig. 12

Before transformation

After transformation

Fig. 13